AUTHORSHIP STATEMENT

Contributions of Skyler Bunn and coauthors are listed below for each chapter.

Chapter 1

1. Skyler Bunn: sole author of Chapter 1.

Chapter 2

1. Skyler Bunn: Development of methodological details; all theoretical results; connection between existing spatial confounding methods and semiparametric regression; extension of existing double machine learning (DML, Chernozhukov et al. 2018) method/theory for partially linear model to multivariable case; all coding, drafting, primary writing related to method, simulation study and application, and manuscript; literature review.
2. Dr. Carabelli: Concept of using DML for spatial confounding; editing/revising; consistent advice/input on all aspects of project; edits to manuscript.
3. Dr. Harvard: domain expertise on application; owns data; edits to manuscript.

Chapter 3

1. Skyler Bunn: Literature review and summary of popular chemical mixture methods; literature review of related work; design of simulation study; primary interpretation of results; primary writing; all coding.
2. Dr. Harvard: Project was motivated by work on Dr. Harvard's GenX Cohort Study project; concept of providing useful method comparison to applied epidemiology re- searchers; domain knowledge and messaging/writing for epidemiology audience; consistent advice/input on all aspects of project; edits to manuscript.
3. Dr. Iverson and Dr. Travis: Suggestions and edits to simulation design and manuscript from Statistics perspective.

Chapter 4

1. Skyler Bunn: Basic concept of using credible intervals around Gaussian process gradients for hypothesis testing; concept of alpha-star statistic; work on improving power of hypothesis tests; primary coding of method, simulation study, and examples; mathematical derivations; design of simulation study and simulated examples; use in two applied examples; all drafting and primary writing of manuscript; literature review.
2. Dr. Carabelli: Heavy improvement of original concept to greatly improve effectiveness; use of BRFF model; suggestion of deep BRFF model; editing/revising; consistent advice/input on all aspects of project; procurement of STRIVE data; edits to manuscript.
3. Dr. Grimes: Expertise on GPs, deep GPs, and GP gradients aiding development of models and methods; work on compatibility with existing R package; editing/revising.

Chapter 5

1. Skyler Bunn: Concept of using GraCI tests (Chapter 4) on semiparametric quantile regression (SPQR) conditional quantile functions to interpret fitted model; numerical approximation to quantile function gradients; primary writing and coding; design of simulation study; literature review; investigation of method's properties.
2. Dr. Carabelli: Concept of using GraCI tests with SPQR density regression model for conditional independence test; procurement of wildfire data; editing/revising; consistent advice/input on all aspects of project; edits to manuscript.

Chapter 6

1. Skyler Bunn: sole author of Chapter 6.

Use of generative artificial intelligence: No generative artificial intelligence was used to write this dissertation.